the area of development of Ocean Atmospheric Modelling for the last 5 years *viz.*, Indian Ocean Modelling and Dynamics Studies (INDOMOD), Satellite Coastal Oceanographic research (SATCORE) and Indian Argo Project.

The INDOMOD project , being carried out by 10 reputed national institutes is designed primarily for development of a suite of wide range ocean-atmospheric models, specifically to address various aspects relating to (i) ocean and climate, (ii) Coastal ocean, (iii) hazardous weather events, (iv) Data assimilation and atlas (v) Observations for validation. Under the project, several experiments were conducted using Ocean and atmospheric General Circulation Models (GCMs) for understanding Indian Monsoon variability. Besides, sediment transport models were also customized for Hooghly and Gulf of Khambhat. As part of the programme, 3 current meter arrays were deployed along the equator (at longitudes 93 E, 83 E and 76 E) in the Indian Ocean and obtained valuable data for a period of 4 years and deployed over 60 drifters in the Bay of Bengal and the Arabian Sea for obtaining surface meteorological and upper ocean data. The results obtained from the project have been resulted into 90 international publications in the reputed Journals.

While under this SATCORE Project several regional algorithms were developed for retrieval satellite parameters (e.g. sea surface temperature, wind, waves chlorophyll, aerosol, water vapour and clouds) from both Indian and foreign satellite. Some of these parameters have already been implemented for the use for operational services at INCOIS.

Under the Indian Argo project, a high resolution Indian Ocean Model based on Modular Ocean Model (MOM) and a Regional Ocean Modelling System (ROMS) for the Indian Ocean have been set up.

Areas affected by global warming

†573. SHRI SHREE GOPAL VYAS:
SHRI VINAY KATIYAR:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) the areas in India which may be adversely affected by global warming in the coming few years;

†Original notice of the question was received in Hindi.

(b) whether there are some areas which may be submerged;

(c) whether there is a danger to the industries being set up or already existing at sea shore on account of this; and

(d) whether in the light of above possibilities, Government are providing due information to the concerned area/States; if so details thereof?

THE MINISTER OF EARTH SCIENCES (SHRI KAPIL SIBAL): (a) An initial assessment of the possible scenario of global warming in different parts of India has been carried out by scientists of Indian Institute of Tropical Meteorology, Pune using the Hadley Center Regional Climate Prediction model-PRECIS. There results have been published by the Ministry of Environment and Forest in their National Communication-I, submitted to the UNFCCC (United Nations Framework Convention on Climate Change). As per this report the warming, by the year 2070, is expected to lie in the range of 1.5-2.°C and it would more or less be uniformly distributed over most parts of India. It is however, expected to be slightly higher over the North West Indian region.

(b) The submergence of coastal areas is a complex process where several factors are involved. Sea level rise induced by global warming is one of the factors. No studies have been made systemically for coastal submergence in different parts of the Indian coastline. However, observations show that there is no significant sea level rise in the recent past. Records of coastal tide gauges in the north Indian Ocean for more than 40 years has yielded sea level rise estimates between 1.06-1.75mm per year, with a regional average of 1.29mm. The global sea level rise estimates reported by the Intergovernmental Panel on Climate Change (IPCC) is 1-2mm per year.

(c) The sea level rise is a slow process as mentioned above. As per the Coastal Regulation Zone Act, no construction is allowed within 500m of coast from the High Tide Level. In view of the above information, there is no danger to any industry in its lifetime.

(d) In view of (c) the issue does not arise.